

## CLAIMS

What is claimed is:

1. A method for determining properties of encapsulated electrophoretic display media, comprising the steps of:
  - (a) providing encapsulated electrophoretic display media comprising a plurality of capsules dispersed in a binder phase, wherein at least one of said plurality of capsules contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid;
  - (b) providing a first electrode and a second electrode, said first and second electrodes adjacent to said plurality of capsules;
  - (c) applying a first electrical signal to said first electrode;
  - (d) applying a second electrical signal to said second electrode; and
  - (e) measuring a first electrical characteristic of said encapsulated electrophoretic display media, said first electrical characteristic generated in response to said applied first and second electrical signals.
2. The method of claim 1, wherein step (e) comprises measuring a first electrical characteristic represented by a time constant.
3. The method of claim 1, wherein step (e) comprises measuring a first electrical characteristic represented by a current.
4. The method of claim 1, wherein step (e) comprises measuring a first electrical characteristic represented by voltage.
5. The method of claim 1, wherein step (e) comprises measuring a first electrical characteristic represented by capacitance.
6. The method of claim 1 further comprising deducing a second electrical characteristic of said encapsulated electrophoretic display media based on said measured first electrical characteristic.

7. The method of claim 6 wherein said second electrical characteristic is resistivity of said encapsulated electrophoretic display media.
8. The method of claim 7 further comprising measuring a first environmental factor of said encapsulated electrophoretic display media using an external sensor.
9. The method of claim 8 further comprising determining a second environmental factor of said encapsulated electrophoretic display media based on said resistivity and said measured first environmental factor.
10. The method of claim 9 wherein one of said first and second environmental factors is temperature and the other is humidity.
11. A method for determining properties of encapsulated electrophoretic display media, comprising the steps of:
  - (a) providing encapsulated electrophoretic display media comprising a plurality of pixels, each pixel comprising at least one capsule dispersed in a binder phase, wherein said at least one capsule contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid;
  - (b) providing a first electrode, said first electrode common and adjacent to each of said plurality of pixels;
  - (c) providing at least one measurement pixel of said plurality of pixels, said at least one measurement pixel having a measurement electrode adjacent thereto;
  - (d) applying a first electrical signal to said first electrode;
  - (e) applying a second electrical signal to said measurement electrode; and
  - (f) measuring a first electrical characteristic of said at least one measuring pixel, said first electrical characteristic generated in response to said applied first and second electrical signals.
12. The method of claim 11, wherein step (f) comprises measuring a first electrical characteristic represented by a time constant.

13. The method of claim 11, wherein step (f) comprises measuring a first electrical characteristic represented by a current.
14. The method of claim 11, wherein step (f) comprises measuring a first electrical characteristic represented by voltage.
15. The method of claim 11, wherein step (f) comprises measuring a first electrical characteristic represented by capacitance.
16. The method of claim 11 further comprising calculating an aggregate first electrical characteristic of said encapsulated electrophoretic display media using measured first electrical characteristics of each of said at least one measurement pixel.
17. The method of claim 11 further comprising deducing a second electrical characteristic of said at least one measurement pixel based on said measured first electrical characteristic.
18. The method of claim 17, wherein said second electrical characteristic is resistivity of said at least one measurement pixel.
19. The method of claim 17 further comprising calculating an aggregate second electrical characteristic of said encapsulated electrophoretic display media using deduced second electrical characteristics of each of said at least one measurement pixel.
20. The method of claim 17 further comprising measuring a first environmental factor of said encapsulated electrophoretic display media using an external sensor.
21. The method of claim 20 further comprising determining a second environmental factor of said encapsulated electrophoretic display media based on said resistivity and said measured first environmental factor.
22. The method of claim 21 wherein one of said first and second environmental factors is temperature, and the other is humidity.

23. A method for detecting a change in an electrical characteristic of encapsulated electrophoretic display media, comprising the steps of:

- (a) providing encapsulated electrophoretic display media comprising a plurality of pixels, each pixel comprising at least one capsule dispersed in a binder phase, wherein said at least one capsule contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid;
- (b) providing a first electrode, said first electrode common and adjacent to each of said plurality of pixels;
- (c) providing at least one measurement pixel of said plurality of pixels, said at least one measurement pixel having a measurement electrode adjacent thereto;
- (d) applying a first electrical signal to said first electrode;
- (e) applying a second electrical signal to said measurement electrode;
- (f) measuring a first electrical characteristic of said at least one measuring pixel, thereby obtaining a first value of said electrical characteristic; said first electrical characteristic generated in response to said applied first and second electrical signals;
- (g) repeating steps (d) – (f), thereby obtaining a second value of said electrical characteristic; and
- (h) comparing said first and second values of said electrical characteristic thereby detecting a change therein.

24. An apparatus for determining properties of encapsulated electrophoretic display media, said encapsulated electrophoretic display media comprising a plurality of capsules dispersed in a binder phase, wherein at least one of said plurality of capsules contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid, and two electrodes adjacent to said plurality of capsules; said apparatus comprising:

- (a) a signal generator for applying electrical signals to said two electrodes;
- and

- (b) a detection circuit for measuring a first electrical characteristic of said encapsulated electrophoretic display media generated in response to said electrical signals.

25. The apparatus of claim 24, further comprising a processor for deducing a second electrical characteristic of said encapsulated electrophoretic display media based on said measured first electrical characteristic.

26. The apparatus of claim 25 wherein said second electrical characteristic is resistivity of said encapsulated electrophoretic display media.

27. The apparatus of claim 26 further comprising measuring a first environmental factor of said encapsulated electrophoretic display media using an external sensor.

28. The apparatus of claim 27 further comprising determining a second environmental factor of said encapsulated electrophoretic display media based on said resistivity and said measured first environmental factor.

29. The apparatus of claim 28 wherein one of said first and second environmental factors is temperature, and other is humidity.

30. The apparatus of claim 24 wherein said detection circuit comprises a capacitance bridge.

31. The apparatus of claim 24 wherein said detection circuit comprises a circuit capable of measuring time constants.

32. The apparatus of claim 24 wherein said detection circuit comprises a circuit capable of measuring frequency.

33. The apparatus of claim 24 wherein said detection circuit comprises a circuit capable of measuring voltage.

34. An electrophoretic display comprising encapsulated electrophoretic display media comprising a plurality of pixels, each pixel comprising at least one capsule dispersed in a

binder phase, wherein said at least one capsule contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid, and capable of determining properties of individual pixels, said electrophoretic display comprising:

- (a) a first electrode, said first electrode common and adjacent to each of said plurality of pixels;
- (b) at least one measurement pixel of said plurality of pixels, said at least one measurement pixel having a measurement electrode adjacent thereto;
- (c) a signal generator for applying electrical signals to said first electrode and said measurement electrode; and
- (d) a detection circuit for measuring a first electrical characteristic of said at least one measurement pixel, said first electrical characteristic generated in response to said applied electrical signals.

35. The electrophoretic display of claim 34 further comprising a processor for deducing a second electrical characteristic of said at least one measurement pixel based on said measured first electrical characteristic.

36. The electrophoretic display of claim 35 wherein said second electrical characteristic comprises resistivity of said at least one measurement pixel.

37. The electrophoretic display of claim 36 further comprising measuring a first environmental factor of said encapsulated electrophoretic display media using an external sensor.

38. The electrophoretic display of claim 37 further comprising determining a second environmental factor of said encapsulated electrophoretic display media based on said resistivity and said measured first environmental factor.

39. The electrophoretic display of claim 38 wherein one of said first and second environmental factors is temperature, and the other is humidity.

40. The electrophoretic display of claim 34 wherein said detection circuit comprises a capacitance bridge.
41. The electrophoretic display of claim 34 wherein said detection circuit comprises a circuit capable of measuring time constants.
42. The electrophoretic display of claim 34 wherein said detection circuit comprises a circuit capable of measuring frequency
43. The electrophoretic display of claim 34 wherein said detection circuit comprises a circuit capable of measuring voltage.
44. An input device, comprising
- (a) encapsulated electrophoretic display media, said encapsulated electrophoretic display media comprising a plurality of pixels, each pixel comprising at least one capsule dispersed in a binder phase, wherein said at least one capsule contains an electrophoretic contrast media phase that includes at least one particle and a suspending fluid, each pixel having a pixel electrode adjacent thereto;
  - (b) a first electrode, said first electrode common and adjacent to each of said plurality of pixels;
  - (c) a signal generator for applying electrical signals to said first electrode and each of said pixel electrodes;
  - (d) a detection circuit for measuring a first electrical characteristic of each of said plurality of pixels, said first electrical characteristic generated in response to said applied electrical signals;
  - (e) a discriminator circuit for detecting a change in said first electrical characteristic of at least one pixel of said plurality of pixels; and
  - (f) a response generator for generating a response to said change and identifying said at least one pixel.

45. The input device of claim 44 wherein said first electrical characteristic is a voltage or capacitance.

46. The input device of claim 44, further comprising a processor for deducing a second electrical characteristic of said at least one pixel based on said measured first electrical characteristic.

47. The input device of claim 46 wherein said second electrical characteristic is resistivity.

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